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ABSTRACT

A project was conducted in Dudley Metropolitan Borough in the West Midlands, England, to determine needs for engineering training in the face of declining industry and to halt the decline in industry and enrollment in the three colleges in the area. A project leader was chosen and a team trained in 3 weeks of workshops on market research, training needs analysis, and consultancy skills. The team visited small companies in the area, interviewed managers, and observed in the factories. The most important outcome of the project was the development of staff skills. The needs identification process was carried out in a variety of companies, and many training needs were exposed, especially in supervisory practices. The team also found that skill shortages were real, but that small companies had trouble providing training because of cost and lack of expertise. The staff became capable of acting as training consultants and designed training packages to meet identified needs and delivered at times suited to the clients, in the colleges or jointly with the companies. The project concluded that more marketing of college training programs is needed. (Case studies of several companies are included in the report. Appendixes include examples of pilot programs and a glossary.) (KC)

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Training for small and medium companies

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Training for small and medium companies

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RP497

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Foreword

This document is the report of an interesting and unusual FEU/PICKUP project (RP497) related to training needs analysis. While based in one area of the curriculum — the training needs of the engineering industry in Dudley — its findings are transferable to other curriculum areas.

The aims of the project were to research, design and pilot training courses and their delivery methods to meet the particular needs of small and medium enterprises (SMEs) in the engineering sector more effectively than courses currently available.

The report describes how these aims were realised, and how they developed to meet the situations arising during the implementation of the project.

The problem faced by the Dudley colleges is that while there are many small employers, often with differing needs, there is no real tradition of using the colleges (or anyone else) for training. College staff have been trained in a needs analysis process requiring them to visit a particular company and undertake a detailed company audit. The report describes the logistical problems they had to overcome in implementing the project. They found that company problems were often related to financial concerns as much as to technical or training needs with the result that the best source of consultancy from within colleges often resided in non-technical departments. Where training was needed, appropriate college staff prepared and delivered the curricula, or recommended other providers where they did not have the resources to do so. **A key requirement is that some solution should be offered to any problem or training need that has been identified.** It is likely in these circumstances that the college may have to become a broker, possibly acting as a 'group training agency' on behalf of small employers in its locality.

The project also examined an unfamiliar approach to training needs analysis which stresses the FE viewpoint, but which may have relevance in many areas, particularly where colleges seek to link with the new Training and Enterprise Councils (TECs) to increase the amount and quality of training in their area in support of local enterprise.

Albert Clyde
Development Officer
Further Education Unit

A personal view

Sincere thanks must go to the following people whose skill, dedication, and enthusiasm contributed to the success of the project; to Geoff Doherty and Ernie Woodhall whose original research gave the impetus to the project; to Lilian Knight,the Project Leader, for her uncanny ability to ask the right, awkward, questions at exactly the right time; to all members of the Project Steering Committee; to the lecturers concerned — Mike Hughes, Ken Payton, Phil Howard, and Trevor Brazier; to Stuart Harris who provided valuable administrative support; to Albert Clyde, FEU Development Officer; and lastly to those companies who provided access to their working practices and operations. The opportunity, in a small way, to contribute to the economic regeneration of a region blighted by recession provided everyone involved with enormous personal satisfaction.

This project clearly demonstrated the important role colleges play in training. Once colleges become involved, training assumes a demonstrable value since the savings to companies are huge and the costs relatively small. On one hand the company gained through a better equipped and skilled workforce and on the other, college lecturers could actually see the consequences of their efforts to train workers and derived tremendous job satisfaction knowing that they were ultimately making a real difference to the economy. The growing confidence and commitment of the lecturers involved has shown what can be achieved by a committed investment in people.

The desire of college managers to build on and develop the work undertaken puts the future of further education in a more optimistic light.

It is hoped that this report will encourage others involved in FE to try out new approaches to local needs by shifting away from a traditional preoccupation with courses and classes towards a more rewarding engagement with the world outside.

Roy Boffy
Chair of Project Steering Committee
General Adviser (FE)
DMB Education Services

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Introduction

Dudley Metropolitan Borough (DMB), in the heart of the Black Country, was severely hit by the recession in the 1980s which decimated its industrial base. Heavy engineering had gone and with it most of the large employers. Those that remained employed fewer people. Dudley was left with a fragmented industrial base largely composed of small- and medium-sized enterprises (SMEs). The Engineering Departments in the local further education (FE) colleges declined as their traditional markets disappeared.

Nevertheless manufacturing industry still had a role to play in the revival of the West Midlands economy and as skill shortages began to bite, the FE Colleges in their traditional roles were ill placed to help.

The DMB Engineering Needs and Provision Project*, provided the spur to action. This revealed serious skills shortages in the engineering industry in the Borough and an ageing workforce. Young people were already reluctant to enter the industry and the demographic changes on the horizon could only make things worse. Although colleges were running Engineering YTS programmes, there was no strategy to address the problems identified.

The general feeling of the staff (including the project team) in all three colleges was that the Mechanical and Production Engineering Departments had been allowed to decline to an irrecoverable extent. Staff morale was very low, promotion was non-existent, leavers were not being replaced. They felt that they were forgotten. There was also a reluctance to change from established courses and modes of delivery, even though the market in these areas was and is declining.

This is the story of how DMB, with the support of the FEU and the three colleges working together, sought to resolve these problems and halt the spiral of decline.

* Information may be obtained from: Stuart Harris, Marketing Development Co-ordinator, Dudley Metropolitan Borough, Education Services, Westox House, 1 Trinity Road, Dudley, DY1 1JB

The Project

THE NEED FOR THE PROJECT

By 1988, although the economy had not fully recovered, SMEs were beginning to experience skill shortages, but were doing little about it, and generally considered training to be someone else's responsibility. Exceptions occurred only when the need to train was forced upon them by their customers, by legislation, or by the purchase of new equipment.

In this context, it must always be remembered that:

> **where there is a skill shortage, professionals see a training need, but SMEs see a recruitment problem. Training/retraining is not the SMEs' first option. This is the first barrier to be overcome.**

Industry's view of the Borough colleges, to some extent based on their perception of the relevance of Examining Board Syllabuses, was that they were out of touch and did not provide relevant training. Colleges were not seen as serious contenders for the adult retraining market.

The Engineering Departments in all three colleges had lost staff and equipment during the recession.

Most importantly, the DMB *Engineering Needs and Provision Report** had revealed that there was a huge potential market for training in engineering. However, there was no demand for long-duration training for young people. The demand was for training and re-training adult workers which would need new approaches and new structures in the colleges; demand-led rather than course-led provision. The FEU project was set up to help colleges find out how to do this.

TACKLING THE PROBLEM

To implement the recommendations of the Engineering Review DMB emphasised the need to turn the colleges outward to the market place, to identify and meet the particular needs of small companies, and to develop curricula specific to those needs.

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* Source : Dudley Metropolitan Borough (1987)

This involved changing the traditional image and role of colleges from providers of courses to providers of resources. It required attitudinal change at every level and required staff to acquire new skills, in particular consultancy and training needs analysis, combined with a fresh approach to curriculum development.

Colleges and industry in Dudley were facing similar problems in relation to engineering, including:

- a poor image of engineering
- a loss of experienced staff and resources throughout the recession
- changes in the market place
- a requirement to deliver to time and standards defined by the customer
- demographic change, reducing numbers of traditional recruits
- structural changes in the organisation of the industry and its markets

An Engineering Review Implementation Group (ERIG), was established to focus attention on meeting the education and training needs of the engineering industry. It sought to move away from the traditional approach of trying to sell existing provision, towards developing new approaches to new needs.

This approach required the provision of training and education not only for new entrants to engineering, but also for adult training, retraining and upgrading of operators through to managers.

SMEs were seen as a priority area because of the structure of industry in DMB and because it is recognised nationally that this is a difficult market, presenting great challenges to providers.

The Project was focused on SMEs employing fewer than 100 workers, engaged in traditional engineering and situated within the boundaries of the Borough. Appropriate companies which had been in existence for at least eight to ten years and appeared to be reasonably stable were approached to join in the work of the Project.

THE AIM OF THE PROJECT

The initial aim was to develop new provision to meet the needs of SMEs using a corporate approach involving the three Borough Colleges, all of which had similar attitudes and problems, but varying resources and expertise. It was recognised that the Engineering Departments of the Dudley colleges needed to:

- get to know their markets
- meet and talk to their potential clients
- establish relationships with industry
- see the type of work now being done in industry
- see the skills being used (or misused)
- see the type of machinery in use
- identify training needs
- develop provision to meet those needs
- establish whether there was a demand for training as distinct from a need

THE FIRST STEPS

A Project Leader was appointed who had been working in PICKUP provision for several years, principally as a training consultant to engineering companies in the Midlands, and had previously been a Training Manager in the engineering industry. She had first-hand experience of 'the other side of the fence' and could help to bridge the gap between education and industry with her industry-biased, rather than academic, approach to the issues.

The role of the Project Leader was:

- to identify and secure the co-operation of participating companies
- to undertake training in curriculum development for project staff
- to monitor the work of staff and organise regular team meetings for feedback and review of progress
- to produce interim and final reports

In fact the role changed and developed as the project progressed, and as it became obvious that staff development and attitudinal change within the participating colleges would be a major outcome.

A review of the local collaborative projects (LCPs) database and of FEU projects, revealed that many Training Needs Analyses (TNAs) had been conducted using a questionnaire approach, but few had carried out in-depth TNAs and skills analyses to identify needs which participating companies might be unaware of.

The latter approach was adopted and the staff were trained to carry out in-depth TNAs with training support in consultancy skills and market research. Later formal training would be in response to the perceived needs of the team at that time, covering job analysis, curriculum development, and pricing and negotiating, so that staff could go into industry, identify the real needs, develop provision to meet them, and negotiate time, place, duration and price.

While some staff training would be delivered by traditional formal short courses to provide knowledge of techniques, the main skills would be developed by on-the-job training within the company and by informal group sessions provided by the project leader. Training followed by practice was amply justified by the experience of the project.

Four lecturers were seconded for two days a week each. Management were supportive of the work in principle but initially had some doubt that it would spearhead a revival of the engineering departments.

The secondees, were prepared to 'have a go', despite being ambivalent at the beginning as the approach planned was new to them.

TRAINING THE PROJECT TEAM

The initial induction training took the form of training workshops spread over a period of three weeks.

In addition to the seconded staff, each college sent a further four engineering staff to the training workshops which ensured that other members of staff in the colleges were aware of the project and could be supportive of their colleagues.

By the end of the training all were enthusiastic and encouraged, and later in the year three members of this group took part in the final phase of the project.

Topics covered during induction were:

- market research — two days
- training needs analysis — two days
- consultancy skills — two days

The training was provided by the Project Leader and other trainers with practical experience in the areas under consideration. Also, information sessions were organised for all the engineering lecturers in the Borough to increase awareness of the Project and to gain commitment to the changes which were likely to ensue.

Business and Human Resources Plans

One way to discover the training needs of organisations is by reference to their Business and Human Resources plans.

Factors related to Business and Human Resources Plans:

- changes following the introduction of new systems, products, methods, machines, or processes
- changes in the market place resulting in rising or falling order books for certain products
- changes in the market place such as insistence on higher levels of quality or delivery
- age distribution, cover and succession of staff
- existing skill shortages
- likely future demand for key skills and the availability of those skills both internally and externally
- individual staff development and continuation training
- labour turnover
- legislation

The training workshops were structured to give delegates the information needed to prepare simple Business and Human Resources Plans. (Normally, a Business Plan includes financial data on turnover, profit and loss and cash flow projections, but most participating companies would not divulge such information, nor was it necessary for the identification of training needs.)

With hindsight, the time spent on training needs analysis was too short. More time for analytical case studies, for role play and practice in the process would have been beneficial.

By the end of the training period:

- staff had been appointed, trained in basic skills to work as a team, and had begun to get a feel of the state of industry in Dudley
- staff had visited each college and were aware of the total engineering training resources within the FE sector in DMB
- an initial group of eight companies had agreed to work with the Project, all had been visited by members of the team, and had their questions on the aims of the project answered
- the first meeting of the Steering Committee had taken place
- the Project Leader had established relationships with the Project Team, Heads of Engineering and College Principals

PUTTING THEORY INTO PRACTICE

To ensure that the team could devote all their allotted time to the project, a room was provided in which they could meet, make and receive telephone calls and messages, write their reports, and have access to secretarial support.

Of the eight companies which had agreed to participate only one employed more than 40 people on the shop floor. Two were specialist sub-contract machinists/toolmakers, four were mainly in welding and fabrication. The total number of shop floor employees in all eight companies was only 200.

DMB had envisaged a tightly-focused project, with only two months devoted to training needs analysis, followed by curriculum development and piloting. Concern developed that the sample was too small and unlikely to give a realistic picture of the training needs of SMEs in the Borough.

The Project staff worked in teams of two, supporting one another. These pairings were not rigid and as far as possible the teams worked with every type of company. In particular, they did not concentrate on their own engineering disciplines but had to accept the market as it was, not as they might have preferred it to be!

Despite reassurances, all were uncertain about visiting companies where the processes and products were unfamiliar. They were slow to recognise that TNA techniques are transferable, and it is not necessary to be an expert in any particular type of work but rather to:

- observe
- ask appropriate questions
- listen to the answers
- bring in specialists when necessary

All the companies were busy, and so visits could only be arranged at times convenient to them. This was a constant problem.

Training needs in small companies are only ever identified, if at all, when problems arise. The few general exceptions are:

- training required by law, for example, the Press Setter's Certificate
- training provided by a supplier when new equipment is purchased
- training required by a client, for example, welding certification

The objective of the project was to work with the participating companies to identify needs on two broad fronts:

- those arising out of external and internal changes, which if met before the event, would help the company to operate more effectively and profitably;
- those arising out of inefficient working practices.

This required a study of the company as a whole, analyses of the jobs and the knowledge and skills required to perform them, and of individual performance, where appropriate.

THE TNA PROCESS

In each company the owner or a member of the senior management team was visited. It was critical to gain their confidence, since they were being asked to open up their business. Researchers needed to establish credibility and to react appropriately to the business style.

Staff worked in teams of two and alternated roles; one asking questions, the other making notes. After each interview they compared their impressions and where necessary added to the notes. Permission to make notes was requested, since some people were nervous about what was being written down. It was often necessary to explain the purpose of the exercise in some detail before individuals would relax and talk.

Discussions with the Senior Manager provided most of the background information about the company. Interviews did not follow a rigid pattern but interviewers had a mental checklist and ensured that every important point was covered. This discussion identified the elements of the company Business Plan.

The team obtained a listing of employees with their ages and jobs which formed the basis of the Human Resources Plan.

A tour of the factory followed, where they observed the manufacturing process, the types of machines in use, the attention to health and safety and good housekeeping, and the level of activity. They looked for pointers towards the culture and management style of the company and were introduced to supervisors who would be interviewed later.

An essential part of the TNA process was the production of versatility charts which identified the tasks in each section or department, the names and ages of the staff and their competence or need for training. The charts were completed with the aid of the supervisors.

The charts showed:

- what each employee was capable of doing
- where there was a need for cover, i.e. where only one person was capable of performing a key task
- where there was a need for succession planning
- where there was a level of skill which could be developed

The next, or overlapping stage, was interviewing and observing individuals at their work stations, which often revealed training needs of which the operator and the company were unaware.

For example, one supervisor said that her most time-consuming job was the preparation of labels for the boxes in which components were dispatched. She had been supplied with a word processor and remarked how much time this had saved since once she had entered the company name and address, the part description and the part name, she could run off large numbers of labels. But after producing the labels, using two fingers to type in the information, she was asked why she did not use the memory keys, since the customer and part information on the list she worked from were coded. Her reply was 'what memory?' She had not been trained properly and observation of her performance revealed the need.

A training need is the gap between required and actual standards of performance.

However, in many cases, standards of performance in SMEs are not defined cases and neither management nor staff may be aware of the deficiencies. TNA identifies needs which can often be met simply and improve performance significantly.

When interviewing it is important not to jump to conclusions as conflicting views on aspects of the business will be stated.

Similarly, assurances of confidentiality should be given and one person's remarks or experiences should not be quoted to another.

The final stage is to draft the conclusions reached in a report presented (not posted) to the company. This too is critical, this is the time to convert 'needs' into 'wants'.

When the organisation has commissioned a consultant to do the work they will be keen to see the report identify their known needs.

However, TNAs were conducted to identify unrecognised needs too so that provision could be developed to meet them.

Field work

CASE STUDIES

For the field work the project leader worked alongside the staff in companies, initially leading the interviews, but gradually allowing them to take control.

In the course of the project over 40 companies were visited. The following is a resume of the TNAs in the two largest companies.

COMPANY 1

Background

This company, part of a group, manufactures and factors parts for electrical products in modern premises on a new trading estate. They also import machines which they adapt to customer specifications, and operate a hire and reconditioning service for small hand-held tools used with their products.

Established for over 100 years, they moved from London to Dudley three years ago, financing the move from the sale of the London site. With the exception of a small management team, all the labour force have been recruited locally.

Fifteen interviews were carried out, starting with the Finance Director, who was also responsible for personnel matters, and moving on to the Production Supervisor, to whom all the other supervisors reported.

Processes/Machinery

The main processes use were presswork, die casting, plastic moulding, machining, plating and assembly. Tools were made outside by sub-contractors, but there was a small toolroom for repairs. There were several modern automatic presses but no Computer Numerical Control (CNC) machinery and no plans to install any. They buy in machines and modify them to meet customer needs. They also manufacture and hire out small machines for use with their components. These machines were returned to them for reconditioning or re-hiring.

Markets

They exported and imported and supplied most of the major electrical appliance manufacturers in the UK. They had manufacturing and trading links in Malta and Germany and a full order book.

Labour Force

Most of the 60 shop-floor labour force were young and semi- or un- skilled. Labour turnover had been high, particularly in the early stages of operation in the area.

All the toolmakers were versatile and flexible.

The company had particular problems in recruiting toolsetters and semi-skilled engineers. They used two self-employed contract setters in the auto shop and lacked cover in some areas in the toolroom.

Training

At the time of the survey the company retained the services of a Group Training Scheme.

They did not carry out induction or formal training of new recruits or existing staff. Employees were taken on for a probationary trial period to learn by doing amd were dismissed if they failed to come up to standard. There was a fairly high labour turnover which the company accepted.

One apprentice was in training.

The training needs which posed the biggest problems were in the automatic lathe shop where they could not recruit setters, and in the machining area, where only the supervisor could set the 53 machines.

They also needed power press setters and only one man could operate the optical grinder.

No DMB College has multi-spindle autos, or staff skilled in setting but a six-month course is available at the Skill Training Agency in Wolverhampton. However, due to pressure of work, the company could not release any member of the staff for the necessary training.

As with most companies, many of the processes and procedures were peculiar to the organisation and best taught on the job but the company lacked any formal structure for doing so. Only one member of staff had been trained in instruction skills, and that was before joining the company.

Training needs

Training in instruction skills was required for supervisors and key operators. This would reduce the time taken by new recruits to reach experienced worker standard (EWS).

The TNA report was well received and some of the needs have since been met internally, while others are in the pipeline. The company has dispensed with the services of the Group Training Scheme and retained a member of the Project staff as a Training Adviser.

Their view on apprentice training became very positive. They recruited four trainees from Dudley College's Engineering Industry Training Board (EITB) courses. The College planned and monitored the training of these apprentices to EITB standards, a service for which the company paid.

COMPANY 2

Background

This long-established Black Country company, also part of a group, had changed ownership several times and slimmed down to its present size during the recession. They produce stainless steel machine fittings and fabrications for the food, chemical and pharmaceutical industry. The standard of finish is necessarily very high.

Ten people were interviewed, starting with the Works Manager.

Processes and Machinery

The main processes were machining, welding, polishing, tube manipulation and fitting. Most of the machines were conventional but the company had recently installed two CNC lathes and were satisfied with their performance.

The greatest skill area was fitting — the production of complex fabrications to customers' specifications and the welding of the thin-wall stainless steel tubing used.

Polishing of the stainless steel tubing, both internal and external, was a key process since the surface finish had to be of very high quality. This skill was specific to the company and could only be learned on the job.

Markets

The company's customers were large chemical and food processing firms. They exported to four countries in Europe and aimed to expand this aspect of their business.

Labour force

Fourteen of the 40 shop-floor staff were over 50. Labour turnover was low, and most of the employees had been with the company for many years.

They had problems recruiting skilled welders and normally trained on the job for up to 12 months to achieve their required standards. They had used a Skill Centre but were not happy with the outcome. They also had problems with inspectors and polishers because of the specialist nature of their business.

Their current labour problem had been helped by redundancies in another local company; this had happened before.

The fitters are multi-skilled fabricators, time served, and very difficult to replace.

Training

The company had no formal training arrangements. No apprentices had been recruited since the mid-1970s.

There was no induction programme, and no planned or formal training of new recruits.

The CNC setter operator received one week's training from the machine supplier off site and one week in house, but was not fully conversant with the off-line programming system.

Training needs

The company were favorably impressed with the report which showed that some training needs could only be met within the company, e.g. the training of polishers.

Company staff attended pilot courses on tungsten inert gas (TIG) welding of stainless steel and on basic sheet metal/fabrication pattern development. Of particular interest was the one-to-one training given to the female polisher/viewer to enable her to cover for the Inspector. (See Appendix 3)

Additional training was recommended for the existing CNC operator but was not taken up at the time due to pressure of work. However, the company planned to move to double shift working and then to proceed with the training.

The company seeks to achieve BS5750* approval. They are at an early stage but the colleges are well placed to deliver the necessary training.

Members of staff from all three colleges were involved in identifying specialist training needs and two of the colleges delivered training.

The company was satisfied with the results of the training and good relationships were established, particularly during the in-house work. They are likely to turn to DMB Colleges for future training needs.

REFLECTIONS ON THE EARLY MONTHS

The first two TNAs took place in medium-sized companies which had a range of skills and provided useful experience for the project staff.

The work with the first company did not produce any immediate training but the relationships established led to close links with DMB colleges and training work was placed later.

Working in teams of two was effective. Each member of staff supported and learned from the other and their interview styles differed. Work in both companies was quickly completed.

EXTENSION TO OTHER COMPANIES

Work then began in other companies, only two of which had CNC equipment. One, employing 13 skilled craftsmen, had re-equipped after a fire had destroyed its conventional machines. Only one had computer aided design (CAD) and that was a low cost micro-based system.

Eight companies proved to be too small a sample for the project, so contacts were made with others. The most effective method was an introductory telephone call, followed by a brief visit to the company at which stage they were invited to take part in the project.

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* Refer to *Quality Assurance* (FEU, 1988)

One of the project companies indicated that they had already recognised a need for language training so full cost training was negotiated and carried out. This was a bonus and makes the point that it is important not to be blinkered when visiting a company and to be alert for any areas in which the management may be willing to commission training.

The first visit to one company indicated that it had slimmed down considerably during the recession and had no plans for expansion. A second visit four months later revealed that the situation had changed. They were acquiring additional premises and new machinery and it was obviously worth maintaining contact.

This experience makes a second and most important point, that

industrial liaison must be ongoing

since external and internal factors make change inevitable in almost all organisations.

College staff working in PICKUP built up relationships with key staff in local companies by regular visits, so that when change was planned the college was on the spot to identify and offer training before the event.

CONTINUATION TRAINING FOR PROJECT STAFF

Experiential learning was continuous from the start of the Project.

The second phase of formal training took place in the New Year. The Project staff had identified the gaps in their knowledge and hence their training needs. A three-day course covered costing and pricing, job, skill and task analysis, negotiation skills, course development to meet specific needs and emphasised the importance of a flexible and client-led approach.

As before, 12 engineering lecturers from the three colleges attended the workshop as well as the seconded staff.

THE PATTERN EMERGES

After interviews had been held with a variety of engineering companies, from privately-owned to subsidiaries of larger groups and employing from two to 100 workers; much data had been accumulated and common themes had emerged. These included:

- no induction training
- no safety training
- no succession planning
- no structured continuing training
- no instruction skills
- minimal supervisory training, supervisors being selected for their skill on the job
- little or no cover for key jobs
- poor communication between management and shop floor
- little use of outside agencies, and most 'training' on the job, consisting of 'job shadowing'
- little or no knowledge of college facilities for adult training
- dislike of knowledge-based rather than skill-based courses and in particular of C&G and BTEC courses
- little use of Employment Training, particularly in small, skilled, busy companies — 'we've no time to train and no intention of paying to do it'
- full order books, but made up of sub-contract work — vulnerable to the marketplace hence leading to restricted horizons
- expansion limited by recruitment problems, especially for toolmakers, platers, welders and fabricators, press tool and machine setters, particularly multi-spindle auto-setters

- an increasing customer demand for BS5750, coupled with the problems of implementation

- a need for management training — many companies lack even basic systems and controls

- comparatively little new technology in use

- a reluctance to undertake training in most companies, for a variety of reasons, for example:
  - — we cannot spare the people
  - — if we train them, they will expect more money
  - — if we train them, we will upset the other staff
  - — if we train them, we will lose them
  - — we cannot afford to train them

FIELD WORK — THE GOOD NEWS

- Firstly, and probably most importantly for the future of PICKUP in colleges, the methodology was proving to be a most effective way of developing staff. One report concluded: 'the personal development of the seconded staff may be of much greater significance than was originally anticipated'.

  It was already apparent that secondees had developed skills which enabled them to work not just as Industrial Liaison Officers, but as Training Consultants. They provided a service similar to a Group Training Scheme, with the advantage of greater resources in the colleges to back them up.

- Secondly, they had come to recognise that existing methods of delivery, or offering existing provision under a new label, is often not what SMEs want or will pay for.

- Thirdly, their exposure to the range of companies in Dudley, to differing styles of management and varying levels of skill, was providing valuable marketing information for the future.

- Lastly, all the companies visited now knew more about what the colleges could offer and good relationships had been established.

Outcomes of the Project

STAFF TRAINING AND DEVELOPMENT

The most important outcome of the project was the staff development of skills.

Working only with SMEs, and confining the work to the Dudley Metropolitan Borough, affected both the volume of training identified and the number of courses piloted.

Nevertheless, the process of identifying needs was carried out in a wide variety of companies with differing processes and products, which was as important as the development of consultancy skills. Different cultures and management styles required different approaches.

Looking back, more time should have been given to practical work, even if it extended the length or reduced the content of the programme.

Examples of Training Reports and Plans were provided and used as models. However, staff had problems with this, and practical work on report writing and verbal feedback should have been incorporated into the workshops.

MEETING THE NEEDS OF DUDLEY SMEs

The project brief was to:

> **research, design and pilot training courses and their delivery methods which will meet the particular needs of SMEs in the Engineering sector more effectively than currently available courses**

While the project concentrated on the manufacturing processes, many needs for supervisory and management training were exposed — many problems could be seen to stem from a lack of management expertise. This will be a growing training area for DMB Colleges in the coming years. It may be more difficult to convince managers that **they** need training as much as their employees, but the challenge must be faced and met.

Project staff found that the skill shortages reported in the DMB Engineering Needs and Provision Project were real and that there was no short-term solution. It had been thought that companies might be prepared to upgrade existing staff or to train for single rather than broad-based craft skills, but this

was not the case. Many companies employing skilled labour continued to rely on other company closures for their recruitment.

Some companies became convinced of the value of first year apprentice training, and were persuaded to employ craft apprentices. These followed the EITB modular structure for craft training.* However, companies employing under forty people do not come within the scope of the EITB and tend not to do the appropriate continuation training after the broad-based training year.

Dudley College of Technology now offers an apprentice follow up service, under which the apprentice is registered with the EITB.

The College plans the training to meet the needs of the company, and intends to monitor progress until module training is completed and a Certificate of Craftsmanship awarded by the EITB.

More generally, the problem of attitudes to training within SMEs is national rather than local.

Some of the reasons SMEs neglect training are:

- they do not have the expertise to recognise when training is required
- traditional modes of delivery do not always meet their needs
- they have to be convinced that training will improve performance and save them money

The project staff sought to address these problems with:

Training Consultancy

The staff became capable of acting as training consultants, identifying needs and reporting back verbally and in writing, justifying their recommendations. Two companies commissioned TNAs.

* Full details are contained in the *TR23 — Training in Engineering Craft Skills* from: EITB Publications (UK), PO Box 75, Stockport, Cheshire, SK4 1PH).

The team produced a training plan and report for a company which had come within the scope of the EITB levy of 1% of payroll, employing more than 40 people. The company had carried out training and had more planned, but did not have the expertise to document it to the Board Training Advisor. The Plan and Report were presented and the company secured exemption from levy. The company has placed further training work with two of the Colleges.

Conducting a TNA is time consuming, and colleges will have to consider how and when they will offer this service. Possible alternatives are either a one-off consultancy exercise, or a package which will also involve delivery of training, charged according to the number of people employed.

While a full TNA may often not be necessary, staff have the skills to identify training needs. They have gained experience in asking the questions which will ensure that the provision meets the needs.

Alternative modes of delivery

Training packages were designed to meet identified needs, delivered at times to suit the clients, working in the company, in the college or jointly using the resources of both. Companies have been able to measure improvement in performance as a result of this training.

The team researched alternative modes of delivery, such as interactive video packages and distance learning to support the teaching of skills to employed adults, in order to incorporate these methods into future provision.

The need for modularised, roll-on, roll-off provision already offered under Employment Training was seen as relevant to the employed adult market.

Selling training

Since training should be seen as a product there is a need to **sell the benefits**.

- People buy what a product will do for them, not what a product is.
- The buyer will only say 'yes' when the benefits outweigh the cost.

Therefore, the first course was the most critical, but if it met the identified needs and produced an improvement, further training 'sold itself'. The key was to make sure that the provision met real needs, and was of high quality.

This approach was used and has proved **successful**.

THE COLLEGES

Attitudes in colleges have changed. It will be some time before engineering is restored to its former prominence within DMB and the institutions but as a result of the project it is recognised that there is a market which, if nurtured, will grow.

College managers now realise the value of going to the clients rather than waiting for them to come to the college. Each college plans to continue the work, using the project staff, but also to expand into other disciplines, and build on its expertise.

There is recognition of a requirement for continuing training and development of staff geared specifically to the changing market place, which also extends to administrative and clerical functions, as the concept of 'customer care', already recognised in service industries, becomes increasingly important in education.

POINTS FOR COLLEGE MANAGEMENT

Colleges traditionally met employer needs by carrying out foundation training of young people, for example in the wide range of craft skills or in business and management studies. Much has been done to encourage colleges to embark on PICKUP work and most of them have.

However, there is still a large training market waiting to be tapped. Skill shortages are not confined to engineering — technology is changing all the time and employers need to update staff. External and internal factors over which employers have no control impose a need for training.

Colleges have traditionally produced an annual prospectus, opened their doors in September and virtually said 'this is what we have, come and get it.' The new approach must be 'we will identify what you need and deliver it.'

College management has been faced with many changes over recent years, and many more are in the pipeline as staff move out of the safety of the lecture room to work with industry and commerce, meeting their identified needs at a convenient time and place.

If a college decides to train a group of people to act as Training Advisers, the lead must come from senior management who must show their commitment to the work.

Staff attitudes, skill and knowledge must be updated in a structured fashion. Administrative and clerical staff should not be overlooked. This Project

formally identified training needs in a wide variety of companies, taking into account the business and staff needs of those companies. How many educational institutions plan, implement and evaluate their staff development in this way? Successful businesses have moved away from a random approach to systematically training staff to meet their needs. Project staff have been encouraging industry to do this, and all colleges must also do so in this new competitive climate. This lead must come from senior management.

Administration procedures in many colleges are slow and cumbersome. Colleges must be able to respond to a client with a costed proposal within a couple of days.

A policy on pricing and costing must be evolved, taking into account what the market will bear. There should be a policy on the revenue generated which motivates the Faculty involved to expand PICKUP work.

Communication systems within the College should be reviewed so that all staff are aware of procedures and can ensure a quick response to employers.
Staff working in the field will need:

- adequate remission
- a dedicated office, where they can receive visitors, keep files, make and receive telephone calls, and do the paperwork
- support staff who can react professionally to incoming telephone calls in the absence of field staff
- a telephone answering machine
- immediate access to a decision maker if there is a problem on staffing, accommodation, or pricing

Consider:

- Is the accommodation clean, suitable and comfortable enough? Are adequate eating facilities provided at all times? Are the toilet facilities well signposted, clean and modern?
- Are desktop publishing facilities available to produce professional quality handouts for short courses? This may require two or three weeks' notice.
- Is there a mechanism for responding to client complaints?
- Is the data base constantly updated?

The market for training is growing but so is the competition to provide it. When beginning PICKUP work, or expanding into new areas, there may be a slow start until a reputation is established. There must be an investment of time and money to ensure that staff are trained to respond to the market.

DO NOT OVERPRICE OR UNDERPRICE — the first will lose the work, the second can only be a short-term policy.

Finally, be clear about aims and objectives. Build employer links in every way possible. Appoint the best possible staff to work on PICKUP. Ensure that they are properly trained and given full support. Set realistic targets, particularly in the first year. Recognise the value of the work, not just in terms of income, but in changing perceptions, knowledge and attitudes.

POINTS FOR STAFF DEVELOPMENT OFFICERS

Although the techniques developed in the project are recommended by some Industrial Training Boards, this project was exceptional in training lecturers to a high level in TNA skills, which were then applied in companies usually too mall to have access to or appreciate the benefits of such analysis.

The training model followed in this project used intensive off-the-job training followed up by supervised practical experience in a company.

The work is very different from the normal role of a lecturer; techniques learned must be reinforced by experience which is expensive in both resources and time.

As with any other skill, staff must be carefully selected for training. They should be:

- interested and enthusiastic, not 'press-ganged'
- capable of relating to many different types of people
- good listeners
- able to interpret and analyse business data
- able to draw valid conclusions from observing work processes
- able to recognise that not all business or performance problems can be resolved by training

- able to communicate their ideas and findings verbally and in writing
- able to convince the client and sell the benefits of training
- able to work in an environment where the other party sets the tone
- able to cope with and learn from failure — not every proposal succeeds
- aware of, or quickly able to identify, the resources of their institution
- able to present innovative solutions to individual problems
- able to evaluate and monitor; be prepared to adapt to client needs

Training need will vary from person to person, depending on their background, experience and personality but a training programme must cover:

- training needs analysis at organisational, occupational and individual levels
- data collection methods including interviews, questionnaires and staff analysis
- consultancy skills
- marketing skills
- evaluation and monitoring skills

If the field work on Training Needs Analysis is effective, updating and retraining work for adults will be generated for the college.

Staff development programmes **must** therefore recognise the need to train the staff who will be called upon to deliver. This will not just involve updating in new technology and looking ahead to changes, such as the increasing emphasis on total quality, or the advent of 1992. Training in developing provision to meet specific identified needs and recognising the prior learning and experience of the participants will be equally important.

Similarly, training will be necessary for administrative and support staff.

Staff developers, marketing and market research staff, and those working in the field as needs analysts/consultants, must establish strong links to ensure that the total exercise of turning the college outwards to the market place is successful.

Appendices : Examples of Pilot Provision

1: INTRODUCTION TO STATISTICAL PROCESS CONTROL (SPC)

During the course of work with a medium-sized engineering company, the Production Manager expressed an interest in SPC for improving quality. The company employed around 50 people in the manufacture of nuts and bolts.

After discussion, it was decided to concentrate on the production of nuts, where customer returns were a problem and normal inspection procedures were protracted in view of the quantities involved (25,000 to a bucket).

A programme was drawn up for individual training of the Production Manager, the aim of which was 'to introduce and evaluate SPC on one product range which requires an Acceptable Quality Level (AQL) of one per cent'.

It was agreed that training would take place within the company during the production period of 1.5 million nuts, over approximately seven to eight weeks. Each session would last between 1.5 and 2.5 hours. Each week a new concept would be introduced and the trainee would introduce that element of SPC into the manufacturing process. Any problems would be discussed and resolved at the next session.

The programme was as follows:

Session 1a
- introduction to variability in machining processes
- how to calculate normal distribution

1b
- plot tally charts to establish if process achieves normal distribution
- trainee to implement this procedure

Session 2
- evaluate tally chart results
- review inspection and rejection reports to date
- produce graphs and bar charts to record inspection results
- trainee to produce bar charts on production

Session 3
- introduction to process control
- how to construct tolerance-based charts
- how to calculate x and w plotting charts
- sampling procedures

Session 4
- introduction to control limits for tolerance-based charts based on BS 2564
- calculation of control limits
- interpretation of x and w point movement on production process charts

Session 5
- evaluation of chart use to date
- update inspection records

Session 6
- review new procedures in use
- review improvement in quality arising out of use of SPC techniques
- address employees on 'Quality and the part SPC can play'

Session 7
- continuation of support on the use of SPC in the production of nuts

Session 8
- evaluate learning process and outcomes on product quality
- discuss introduction of SPC in other manufacturing areas

Report by lecturer who prepared and delivered the course

The owner-director of this company had no interest in SPC initially, but the Production Manager wanted to introduce it.

The outcome has been a noticeable improvement in quality. Nuts are no longer rejected internally or returned by customers. This has resulted in improved productivity (time saved in inspection) and profitability (reduction in scrap, increased output).

The company now wishes to introduce SPC into other manufacturing areas and to train more staff.

This approach to meeting the very specific needs of key individuals within a small company and observing the benefits to the company as working practices changed has given much personal satisfaction to staff.

Techniques such as SPC are of value in improving quality but an emphasis on theory rather than practical application can be inhibiting. Colleges can help companies to implement change by tailoring the content and pace of training to their needs and, as in this case, providing continuing support.

2: INTERNAL AUDIT TRAINING FOR A SMALL ENGINEERING/FABRICATION COMPANY

The company had identified a need for training for two inspectors in internal audit techniques. They had considered three- and five-day courses offered by both FE and commercial organisations but decided they were both too advanced and too expensive.

After some discussion a short practical course was proposed, based on the company quality system.

Timing was critical, since the company did not want to lose production by releasing key staff.

Agreement was reached on a programme which would be delivered partly in company time, but mainly out of hours. This involved two three-hour sessions during one week, in college, followed by a five-hour session on the following Saturday, held on company premises.

The programme was as follows:

Session 1.

3.30 p.m. — 6.30 p.m. in College

- what is BS5750; what does it do for the Company
- the role of internal and external audits in a quality system
- key differences between internal and external audits
- how to plan an internal audit
- human reaction to audits

Session 2.

3.30 p.m. — 6.30 p.m. in College

- practical session in College Library. Trainees to audit a procedure on book traceability
- review audit, lessons learned, transferability of the procedure
- review Company procedure — plan which area would be audited in final session

Session 3.

9 a.m. — 3 p.m. on Company premises

- practical audit on the job
- discussion on outcomes, problems and conclusions
- course of action to take post-audit on non-conformity
- maintenance of audit discipline and procedures

Report by lecturer who prepared and delivered the course

I met with the Quality Manager one week after the course. He informed me that the trainees were performing very well and had completed audits in other sections of the company.

The company was satisfied with the tailor-made training, which had been pitched at precisely the level they required, and have now expressed interest in placing further work with the college.

I found the approach a challenge to traditional modes of delivery but both interesting and rewarding.

The company paid the full cost of the training.

3: INTRODUCTION TO INSPECTION TECHNIQUES

This company, manufacturing stainless steel pipes and fabrications for the pharmaceutical and food processing industry, has problems in recruiting inspectors with both the specific product knowledge and the necessary inspection techniques.

The TNA report recommended that a female polisher/viewer who had an appreciation of the standards of finish required by client companies should receive formal training to carry out inspection duties.

The company agreed and after reviewing her existing knowledge we decided to upgrade her basic engineering knowledge which would then be reinforced by work in company, on company products.

The trainee attended college for seven sessions of 2.5 hours each. The knowledge/skill gained is transferable to any inspection role.

Training was then transferred to company premises where the trainee was given guidance in putting the knowledge into practice, inspecting complex fabrications and pipework assemblies against drawings, and carrying out all the duties of an inspector in a company where quality is paramount.

Report by lecturer who prepared and delivered training

This trainee, in her mid-twenties, was a very good polisher/viewer who knew the standards of finish required but had had no formal engineering training. At the end of the training both she and the company were pleased with her progress and she is increasingly being given inspection work.

With hindsight, it would have been better to carry out most of the training within the company, rather than at college. She was more relaxed in her familiar environment and learned more quickly when theory was related to practice on work she knew. I also found in this, as in other companies where I have delivered training in company, that other employees become interested and this increases the internal pressure on the company to provide training.

My own knowledge and experience was increased by working alongside people in their working environment.

4: ENGINEERING FUNDAMENTALS FOR UNSKILLED/ SEMI-SKILLED WORKERS

In this company, which manufactures bathroom fittings, the principal need identified was for good basic working practices in the largely unskilled and inexperienced workforce. A full audit has not been yet carried out but has been requested.

After much discussion to identify needs, a syllabus was drawn up and agreed with the company taking into account the machinery, products, processes, systems and facilities of the organisation.

Training took place in college on Saturday mornings and designated staff attended in groups of nine for four consecutive weeks.

The programmme was as follows:

Session 1.

Safety in the workplace:

- film on safety at work
- discussion on film and its relevance to the working environment of the delegates
- the Health and Safety at Work Act
- the responsibility of the individual under the law
- personal hygiene
- protective clothing

Session 2.

Correct application of basic processes specifically related to machines and materials in use:

- drilling
  tapping
  reaming
  turning
- sharpening of drills and cutting tools
- safe use of coolants
- correct methods of lifting, handling and moving raw materials and components

Session 3.

Drawing appreciation:

- reading and understanding component and assembly drawings
- the use of Imperial and Metric measuring equipment
- assembly drawings

- pictorial diagrams
- orthographic and isometric projection

Session 4.

Fire Prevention / First Aid at Work:

- film
- use of extinguishers
- electrical fires
- chemical fires
- escape procedures
- general First Aid

Report on training by lecturer who organised, prepared and delivered part of the training:

This company was satisfied that this wide ranging, though low level, course met practical needs. It is now well-disposed towards the College and a good relationship has been established.

This was my first experience of organising a course to take place out of normal college hours and the experience of having to make the necessary arrangements was interesting! I had to cut through a lot of red tape and negotiate with staff at all levels.

Additionally, although I was confident of the ability of colleagues who were delivering parts of the course, I felt a sense of personal responsibility towards the client company, and felt an obligation to be present at all sessions to ensure that there were no problems.

5: OTHER EXAMPLES OF WORK IDENTIFIED AND DELIVERED

Basic Sheet Metal / Fabrication Pattern Development

This course was mounted to meet the needs of a small group of companies whose fabricator/welders lacked certain very basic skills.

Training took place in the college in three hourly sessions over ten weeks. The last two weeks contained a project in which course members used the skill and knowledge acquired during the preceding eight weeks.

Both trainees and employers expressed their satisfaction with the training and further work is planned.

Introduction To CNC (Computer Numerical Control) And Turning

While we were working with this company a need was identified to train a young man with limited knowledge of machining so that he could use a CNC lathe. The employer agreed that preliminary work on a conventional machine to explain the principles of metal cutting would be valuable.

A diagnostic session with the trainee indicated that he had the ability to work to standards and that one-to-one training should be delivered in college, with an introduction to the basics of turning on conventional machinery before transferring to CNC.

The trainee reached an acceptable standard on both the conventional and the CNC equipment in a relatively short time.

The employer was satisfied and the training will be followed by full cost training for six further operators when new machines are installed.

Glossary

AQL	—	Acceptable Quality Level
CAD	—	Computer Aided Design
CNC	—	Computer Numerical Control
DMB	—	Dudley Metropolitan Borough
EITB	—	Engineering Industry Training Board
ERIG	—	Engineering Review Implementation Group
EWS	—	Experienced Worker Standard
FEU	—	Further Education Unit
LCPs	—	Local Collaborative Projects
PICKUP	—	Professional, Industrial and Commercial Updating
SMEs	—	Small and Medium Enterprises
SPC	—	Statistical Process Control
TECs	—	Training and Enterprise Councils
TIG	—	Tungsten Inert Gas
TNAs	—	Training Needs Analyses
YTS	—	Youth Training Scheme

PICKUP (Professional, Industrial and Commercial Updating) is an initiative by the Department of Education and Science to stimulate the updating role of education and the part colleges, polytechnics and universities can play in meeting the needs of business for post-experience education and training. Regional Development Agents act as focal points for PICKUP in their localities. They link central and local initiatives for adult education and training, co-ordinating and advising on the various elements of the PICKUP programme. For further information please contact:

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The Further Education Unit (FEU) was established by the Department of Education and Science to give guidance and support to the further education system. FEU advocates and seeks to make possible a more co-ordinated approach to curriculum development, in support of its remit to promote, encourage and develop better learning opportunities in further education. For more information, please contact:

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